

Supplementary File S2. Analytical terms and examples

This file defines the analytical groupings and terms used in the analysis and provides four additional illustrative examples of the analytical procedure in the same evidence-chain format used in Table 1 of the article.

Table S2.1. Analytical groupings, terms and definitions.

Analytical grouping	Analytical term	Definition
Material and spatial operations	Externalising / spatialising	Making materials or interpretations visible and workable by putting them into the workspace as artefacts.
Material and spatial operations	Manipulating	Changing existing workspace items—by moving, duplicating, splitting, extracting, resizing or reformatting them—so they can be analysed.
Material and spatial operations	Organising	Structuring items according to an organising logic, such as grouping them by participant, theme or domain, so they can be compared and interpreted.
Material and spatial operations	Filtering	Narrowing what receives attention by applying a criterion, such as repetition, contextual fit, frequency, a threshold or exemplar value.
Material and spatial operations	Pruning	Reducing complexity by setting material aside, leaving it out of later steps or abandoning an arrangement that no longer helps the analysis.
Interpretive synthesis activities	Prioritising	Deciding what is important enough to carry forward, emphasise or keep in scope.
Interpretive synthesis activities	Judging adequacy and fit	Assessing whether a representation, grouping, placement or interpretation is adequate and fits the material, including resolving uncertainty about where material belongs.
Interpretive synthesis activities	Forging connections	Making links across quotations, codes, themes, artefacts or contexts so relationships and patterns can inform the analysis.
Contextual codes	Affect	Reported emotional or cognitive states accompanying the analysis, such as confusion, doubt, panic, stress or overload.
Contextual codes	Affordances and constraints	Ways the tool, representation or workflow enabled, limited or shaped the analysis.
Contextual codes	Analytic redirection	Changing analytic direction when an approach or representation was not helping the analysis move forward.
Trace mechanisms	Provenance encoding	Retaining identifiers so the origin and participant attribution of material remained identifiable as it was reorganised.
Trace mechanisms	Source linking	Keeping fuller participant material, or a direct route to it, accessible from a code, quotation, theme or other analytic unit.
Trace mechanisms	Relationship marking	Using visible markers or annotations to keep overlaps, hierarchies and cross-artefact connections explicit.
Trace mechanisms	Versioning	Deliberately duplicating a frame, table or arrangement before further change so an earlier or backup state remained available.
Trace mechanisms	Retracing	Returning to fuller participant material when fit or meaning was uncertain so context could be restored and an interpretation reconsidered.

Table S2.2. Illustrative examples of the analytical procedure.

Transcript evidence	Corresponding workspace evidence	Process coding	Deductive and contextual categorisation	Second-pass trace-focused coding
[00:28:38–00:29:06] “I created a mind map. I tried to mind map those themes, and this was the point where I realised I just wasn’t getting to where I needed to be. I was just confusing myself, and I started panicking. ... Okay, wait. I think I know how to move forward now. ... This mind mapping isn’t working.”	The mind-map configuration remained visible after the analysis moved to a different arrangement. The workspace does not show deliberate duplication of this state.	Creating a mind map; mind-mapping themes; judging the arrangement inadequate; rejecting the arrangement; deciding how to move forward.	Kolko-derived: externalising/spatialising; organising; pruning; judging adequacy and fit. Contextual: confusion and panic, together with the limitations of the mind-map arrangement, prompting a change in analytic direction.	N/A — no trace mechanism assigned.
[00:35:49–00:36:55] “Each block is a different card, and each colour is a different participant. ... Each participant has all their cards numbered ... So that meant that at any point I could trace these back to the original card.”	Participant colours and card identifiers remained visible in the participant-organised and code-sorting configurations.	Encoding participants by colour; numbering cards per participant.	Kolko-derived: externalising/spatialising. Contextual: the colour-and-number system as a traceability affordance.	Provenance encoding; source linking.
[01:05:07] “I saw that the frequency was a lot less in some themes and a lot more in others ... so I just duplicated a table ... in case something went wrong. ... I identified eight themes that were felt by at least five or more of the participants.”	The workspace retained the duplicated earlier table beside a subsequent table of eight selected themes with frequency markers and quotations.	Comparing theme frequencies; duplicating the table as a backup; searching for high-frequency themes; selecting eight themes using a five-participant threshold.	Kolko-derived: manipulating; filtering; prioritising; judging adequacy and fit.	Versioning.
[01:11:09–01:14:43] “The issue cards helped me identify ... what these young adults are experiencing. ... The next activities [showed] how and when they are experiencing these issues. ... It was somewhat a form of validation ... these themes also show up in these activities. ... I started identifying where ... the themes connect to ... the daily routine or the persona.”	Theme labels and red annotations were overlaid on the retained persona, day-in-the-life and as-is scenario-map materials, leaving cross-artefact connections visible.	Digitising other workshop activities; validating themes across activities; identifying where themes connect to other activity artefacts; linking persona needs to themes.	Kolko-derived: externalising/spatialising; forging connections; judging adequacy and fit. Contextual: cross-activity comparison as an affordance supporting validation.	Relationship marking.

Note. Timestamps refer to the session recording. Quotations have been lightly punctuated; ellipses omit fillers, repeated wording and brief intervening prompts. The workspace provided evidence of retained configurations; actions, sequence, judgements and reported cognitive effects came from the transcript.